AMERICAN ANNALS OF THE DEAF

FOUNDED 1847

Official Organ

Conference of Executives of American Schools for the Deaf

FOUNDED 1868

Convention of American Instructors of the Deaf

FOUNDED 1850

POWRIE VAUX DOCTOR, Ph.D.
Editor

Under the Direction of the Executive Committee of the Conference

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THE CONFERENCE OF EXECUTIVES OF AMERICAN SCHOOLS FOR THE DEAF

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THE CONFERENCE OF EXECUTIVES OF AMERICAN SCHOOLS FOR THE DEAF, originally the Conference of Superintendents and Principals of American Schools for the Deaf, was founded in 1868 and subsequently incorporated under the laws of the State of Maryland in 1931. The Conference is an organization of the executive heads of schools for the deaf in the United States and Canada, and has for its object "to promote the management and operation of schools for the deaf along the broadest and most effective lines and to further and promote the general welfare of the deaf."

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THE CONVENTION OF AMERICAN INSTRUCTORS OF THE DEAF, founded in 1850 and incorporated by act of Congress in 1897, is an organization of educators of the deaf in the United States and Canada with the general object of "promotion of the education of the deaf on the broadest, most advanced, and practical lines," and for that purpose "to secure the harmonious union in the organization, of all persons actually engaged in educating the deaf in America."

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CONTENTS

ANNOUNCEMENTS OF THE MEETINGS OF THE THIRTY-THIRD ANNUAL CONVENTION OF THE AMERICAN SPEECH AND HEARING ASSOCIATION; THE INTERNATIONAL COUNCIL FOR EXCEPTIONAL CHILDREN; THE ALEXANDER GRAHAM BELL ASSOCIATION FOR THE DEAF; THE INTERNATIONAL CONGRESS AT THE UNIVERSITY OF MANCHESTER 387

A STUDY OF THE WECHSLER PERFORMANCE SCALE (FORM II) AND THE KNOX CUBE TEST WITH DEAF ADOLESCENTS, *C. P. Goetzinger*, PH.D. AND *C. L. Rousey*, PH.D. 388

TACTILE PERCEPTION OF RHYTHMIC PATTERNS BY NORMAL, BLIND, DEAF, AND APHASIC CHILDREN, *Joseph Rosenstein*, B.S. 399

READING—THE KEY TO PROGRESS FOR DEAF CHILDREN, *Margaret H. Fitzgerald*, B.S. 404

ANNUAL INDEX FOR 1957 416

SUPPLEMENT, CONTENTS, VOLUME CII. 1957 ..... iii–viii

AMERICAN ANNALS OF THE DEAF

Vol. 102 November, 1957 No. 5

Announcements

The Thirty-third Annual Convention of The American Speech and Hearing Association will be held at the Netherland Hilton Hotel in Cincinnati, Ohio, Nov. 20–22, 1957.

The program commemorating the Centennial of The Kenda'l School will be held at Gallaudet College Tuesday and Wednesday, Nov. 26th and 27th instead of the dates announced previously.

—Leonard M. Elstad, Pres. Gallaudet College.

The International Council for Exceptional Children will meet in Kansas City, Mo., April 7–12, 1958.

The Alexander Graham Bell Association for the Deaf will meet at the Hotel Webster Hall in Pittsburgh, Pa., June 22–27, 1958.

The International Congress on the Educational Treatment of Deafness will meet at The University of Manchester, Manchester, England, July 15–24, 1958.

A Study of the Wechsler Performance Scale (Form II) and the Knox Cube Test with Deaf Adolescents

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AND

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THE intelligence of children in schools for the deaf has been investigated extensively during the past forty years. The early research of Pintner and his co-workers (22), (25), as well as the Reamer (26) and the National Research Council surveys (4) indicated that the deaf were retarded two or more years in intelligence. In 1928, Drever and Collins (5) in England administered their own performance test of intelligence to both deaf and hearing subjects, and found the former to be equal to or slightly better than the latter.

Subsequent research (2), (13), (14), has shown the deaf to test within normal limits intellectually when performance scales are used. Conversely, when non-verbal tests are employed, such as the Pintner Non-language Mental Test (4), the Raven Matrices (18), and the Porteus Mazes (33), mean I. Q.'s lie in the 80's.

The three large scale studies in which the "Draw-A-Man" test was given to deaf children are not in agreement. On the one hand, Peterson and Williams (20) and Shirley and Goodenough (27) obtained mean I. Q.'s of 79.5 and 83.9 respectively. On the other hand, Springer (28) reported a mean intelligence quotient of 96.4.

Despite the variability in results from one type of measuring instrument to another, and even in instances of the same test; the opinion of many educators and psychologists of the deaf is that the deaf are within normal limits intellectually.

More recently, the trend of research has been directed toward the conceptual and perceptual abilities of deaf children. Heider and Heider (9), (10), Oleron (18), Larr (12), and McKay (16) have reported evidence of retardation in conceptual ability. Likewise, Templin (29) found that hearing loss in children curtailed the development of reasoning ability. It would appear therefore, that there is unaminity of agreement with regard to the inferiority of the deaf in concept formation and reasoning.

In the area of visual perception however, the findings have been in conflict. Myklebust and Brutten (17) found deaf children to be inferior to hearing children on tests of visual perception. Hayes (8) utilizing the same tests could demonstrate no retardation on the part of the deaf. McKay (16) and Larr (12) using different instruments likewise found no inferiority in the visual perceptual organization of deaf children. In addition, Embrey (6) obtained no differences in visual perception between either the congenitally deaf with deaf parents and the congenitally deaf with hearing parents, or between either of these groups and a control group of hearing subjects, matched with reference to I. Q., sex, and chronological age. However, the age range of the subjects was from six to thirteen, and the numbers were small.

In 1956, Hiskey (11) published comparisons of deaf and hearing children, ages four to ten inclusive, on the individual items of the Nebraska Test of Learning Aptitude. He wrote: ". . . the hearing children had a decided advantage on all items where vocalization aided retention (immediate recall). The deaf excelled slightly on some items demanding visual perception (almost entirely) as the approach to analysis and performance." (11, 338). Hiskey found the deaf on the average to be slightly inferior to the hearing with the I. Q. lying near the mid-nineties relative to the hearing norm of one hundred.

Graham and Shapiro (7) investigated the relative effects of pantomime and verbal directions on the administration of the "Performance" part of the Wechsler Intelligence Scale (WISC). They equated 20 deaf subjects on the basis of intelligence, sex, nativity, age, color and health with normally hearing subjects in two groups of 20 each. The

deaf as well as one of the hearing groups were given the WISC using pantomime directions. The other group of hearing children took the test under standard procedure. The mean I. Q.'s for the deaf and the hearing group with pantomime directions were respectively, 96.1 and 95.5. The mean I. Q. for the hearing group which took the test when verbal or standard directions were employed, was 101.15. Graham and Shapiro, therefore, suggested a correction factor of five points when the WISC is utilized with deaf subjects.

The present investigation was undertaken to determine the intelligence of deaf adolescents as measured by the performance scale of the Adult Wechsler, Form II (32). A second reason for the study grew out of Wechsler's stress of the importance to differential diagnosis of intertest variability within the Full Scale (Verbal and Performance) as well as within the Performance Scale. Because of this, and in view of Hiskey's findings that deaf children are inferior to hearing children on items which are influenced by vocalization but slightly superior on tasks requiring "visual perception (almost entirely) as the approach to analysis and performance" (11, 338), it was hypothesized that deaf adolescents vary significantly in subtest performance; and further, that deaf adolescents, identical in performance I. Q., may vary in their intertest performance profile, as a function of sex, onset of deafness (within the limits of the experiment) and etiology. Unfortunately, the congenitally deaf subjects could not be classified on the basis of endogenous, exogenous etiology. Since none of the subtests of the Wechsler measures visual memory span, the Knox Cube Subtest of the Grace Arthur Scale (Form I) (1) was included in the battery.

Specifically, the questions for study were as follows:

1. Do deaf adolescents as a group attain I.Q.'s equivalent to hearing norms on the Performance Scale of the Adult Wechsler (Form II)?
2. Do deaf adolescents as a group evince inferiority on the Knox Cube Test of visual memory span?
3. What is the relationship of visual memory span as tested here to reading achievement?
4. Is the intertest variability of each of the following groups of deaf adolescents statistically significant?

a. The deaf adolescents as a group
b. The male congenitally deaf
c. The female congenitally deaf
d. The males with acquired deafness
e. The females with acquired deafness
f. The meningitic deaf

5. Are there statistically reliable differences between the subtest scores of the following groups when they are matched on the basis of I.Q. and chronological age?
   a. The male vs. the female congenitally deaf
   b. The female congenitally deaf vs. the female with acquired deafness
   c. The male congenitally deaf vs. the male with acquired deafness
   d. The meningitic deaf vs. the subjects with acquired deafness other than meningitis (not matched for sex)
   e. Same as *d* but in addition matched for sex
   f. The meningitic deaf vs. the congenitally deaf (not matched for sex)
6. Do deaf adolescents vary in visual memory span ability as measured by the Knox Cube Test as a function of sex, onset of deafness, and etiology?

Subjects

The subjects of the study were 101 deaf adolescents between the ages 14 and 21 years from a residential school for the deaf. Sixty-one of this number were congenitally deaf. Forty subjects had suffered severe hearing loss as a result of disease between the ages of one and three years. In 18 cases, meningitis had caused the deafness. There were 52 males and 49 females. The average pure tone loss through the frequencies 250–4000 cps for the total group in the better ear was 93 db. One of the criteria for hearing impairment was that no child should have a loss of less than 70 db in his better ear. In all cases severe hearing impairment constituting deafness was present at birth or had occurred not later than the age of three.

Procedure

Each subject was given a pure tone audiometric test, and the performance scale (Form II) of the Wechsler-Bellevue Adult Scale of Intelligence. In addition, 91 of the subjects were given the Knox Cube Test of Visual

Memory Span from the Grace Arthur Scale (Form I) at the time of the Wechsler test. In accordance with the Arthur procedure, the Knox Cube was administered as the first and last subtest of the performance scale. The sum of the two trials constituted the scores for study. Mental age is easily computed by averaging the two trials and by referring to the Arthur manual.

The data were treated by means of an analysis of variance by ranks and by the sum of ranks test (30). In addition, scores of the subjects on the Stanford Achievement Test were available. A partial correlation with chronological age and years spent in school controlled statistically was computed between the scores on the Knox Cube Test and Paragraph meaning part of the Stanford.

Results

In Table I are shown the primary data for the total group of 101 subjects. The mean I. Q. of 100.9 is obviously indicative of normal intelligence. It is also apparent that variability exists in the weighted sub-test scores. For example, the subjects obtained a higher mean score on Object Assembly than on Picture Completion, etc. It is interesting to note that of the five subtests of the Wechsler, the deaf did least well on Picture Completion. The degree of retardation as manifested here when compared to the norms for the age level is about one year. On the Completion-of-Drawings item of the Nebraska Scale, a subtest somewhat similar to the Picture Completion

TABLE I

101

Primary Data for 101 Deaf Adolescents

	Mean	*S.D.*	*Range*
Wechsler I.Q.'s	100.9	13.33	139–67
Picture Arrangement	9.9	2.8	17–3
Picture Completion	9.2	2.1	13–4
Block Design	10.7	3.1	17–2
Object Assembly	12.1	1.9	16–7
Digit Symbols	10.5	2.4	17–5
Knox Cube	16.2*	3.0	24–9
Chronological Age (months)	207.0	22.7	248–169

* Total of 2 trials

of the Wechsler, Hiskey (11) found fewer deaf children than hearing children to pass at each age level thru the range four to ten inclusive. He attributed the deficit to greater difficulty on the part of the deaf in understanding pantomime directions than of normally hearing children in comprehending verbal directions. Graham and Shapiro (7) on the other hand demonstrated no differences in the scores of the deaf and hearing on the Picture Completion subtest of the WISC regardless of whether the directions were pantomime or verbal. In the present study difficult understanding as a result of pantomime directions did not appear to be a problem. It should be noted nevertheless, that the age range studied by Hiskey was from four to ten as compared to the range of 14 to 21 in this investigation. It seems to us that the Picture Completion subtest at the age range of our subjects reflects the language weakness of the deaf. By referring again to Table I it is seen that Picture Arrangement represents the second lowest score of the scale. Difficulty in subvocalization as a result of restricted language concepts and hence, usage, is thought to explain the discrepancy. Conversely, this group of deaf adolescents obtained subtest scores on Block Design (10.7), and Digit-Symbols (10.5), which are equivalent to the norms at this age level; and their scores exceeded the norms on the Object Assembly subtest (12.1). Apparently, Hiskey's feeling that the deaf tend to do better on items less associated with language has some validity.

The score of 16.2 for the two trials of the Knox Cube subtest (average of 8.1) is indicative of a mental age of 12 years-five months according to the standardization of the Grace Arthur Scale, Form I. Although Arthur does not present norms above this level, it appears important to note that the average score of 8.1 which was obtained by the deaf adolescents represents the minimum score for the age level. In other words, our deaf subjects whose mean chronological age was 17 years-2 months attained a mental age level of 12 years-5 months exactly. No conclusions can be drawn relative to retardation in visual memory span from these results.

In order to find out the relationship between visual memory span and reading achievement in school, a partial correlation with chronological age and years spent in school, controlled statistically, was computed between the Knox Cube and Paragraph Meaning of the Stanford Achievement Test for the 91 subjects. The obtained partial correlation of +.158 was not significant at the 5 per cent level of confidence. Evidently, the Knox Cube test is not associated with achievement in reading at this age range. It would appear, then, that visual memory span as measured by the Knox Cube is not related to under-achievement in reading comprehension.

The fourth question for study pertained to the statistical significance of the observed subtest variability of the deaf subjects as a group. Thirty cases from the total group of 101 were selected by a table of random numbers for this analysis. In addition, the intertest variability of the 31 males and 29 female congenitally deaf, the 20 male and 21 females with acquired deafness, and the 18 meningitic deaf, was tested by an analysis of variance by ranks. For all the aforementioned classifications the F ratios were significant at better than the one per cent level of confidence. The intertest variability for each group was therefore, highly significant.

In view of the highly significant intertest variability as found above, the data were further analyzed to determine whether the variability in subtest scores was similar for each classification. To this end the following tests were made:

First, 16 congenitally deaf males were matched with 16 congenitally deaf females with respect to Wechsler Performance I. Q. and chronological age. An analysis of variance by rank was computed on each group and the F ratios were significant at beyond the one per cent level. Differences between the scores of the males and females for each subtest were then evaluated by the sum of ranks. None of the differences was statistically significant. In only one instance, and that in the case of Picture Arrangement where the "z" reached the 10 per cent level of confidence in favor of the girls, was there even a trend. It

would appear therefore, that there are no sex differences on the Wechsler Performance Test profile within the conditions of the matching.

Second, 10 congenitally deaf males and 10 males with acquired deafness other than as a result of meningitis were matched as above and studied in a similar manner. The F ratios for each group were significant at the one per cent level. Again, there were no significant differences between the groups on the subtests. Their performance patterns were thus, identical. The same results were obtained when two groups of eight females each were analyzed under similar conditions.

Third, 9 meningitic deaf were equated with 9 subjects whose deafness had occurred as a result of disease other than meningitis, for I. Q., chronological age and sex. Intertest variability for each group was highly significant, but there were no differences between the profiles of each group.

Fourth, 13 congenitally deaf subjects were matched with 13 meningitic deaf in I. Q. and chronological age, but not sex. F ratios, as in previous groupings, were highly significant. When however, the differences in the subtest scores were analyzed by the sum of ranks test only the difference between Digit-Symbols was significant. The "z" for this subtest was 1.90. The congenitally deaf showed superiority on this task and the level of confidence is 5 per cent. The 13 congenitally deaf exceeded the norms for the subtest which was true also for the congenitally deaf as a group. The 13 meningitic deaf as well as the total group of 18, nevertheless, scored at approximately the mean of the norms. As a general conclusion, it would appear that the intertest variability of deaf adolescents is a function of deafness, and not of etiology within the conditions of this study.

Finally, differences in scores on the Knox Cube Test were studied by sum of ranks between 25 congenitally deaf males and 26 congenitally deaf females, between 17 males with acquired deafness and 16 females with acquired deafness (meningitics included), between 11 meningitics and 22 subjects with acquired deafness other than as a

result of meningitis. In no instance were the "z's" significant at the five per cent level of confidence. There were, therefore, no differences in visual memory span between the groups. The fact that the adolescents with acquired deafness had once heard, if only from one to three years, had no positive influence upon their ability on this test.

Summary and Conclusions

1. The mean intelligence quotient for 101 deaf adolescents on the Wechsler Performance Scale, Form II, was found to be 101.9. These results indicate that a correction factor is not necessary when Form II of the adult test is used with deaf adolescents.

The deaf as a group performed poorer on the Picture Arrangement and Picture Completion than on the remaining three subtests of the Performance Part of the Wechsler Scale, Form II. The finding appears to reflect difficulty in subvocalization due to restricted language concepts and hence, usage.

2. The subjects tended to show retardation in visual memory span as measured by the Knox Cube. The partial correlation however, with chronological age and years spent in school held constant statistically, between the Knox Cube and Paragraph Meaning was low and not significant at the 5 per cent level of confidence. Evidently, there is no relationship between memory span as tested and success in reading comprehension at this age level.

3. The intertest variability of the deaf as a group on the Wechsler Performance Scale as a function of sex and of etiology within the limits of the study was significant at better than one per cent level of confidence for each classification.

4. When the pattern of subtest variability was analyzed between groups there were no differences except with reference to the congenitally deaf and meningitic deaf. Here the difference in the Digit-Symbols scores was significant at the 5 per cent level of confidence. Further study is indicated. In general, it is concluded that deafness and not etiology is the reason for the highly significant intertest variability within each group.

5. None of the differences between groups was significant on the Knox Cube Test. The subjects with acquired deafness did not benefit as a result of having possessed hearing for a few years.

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Tactile Perception of Rhythmic Patterns by Normal, Blind, Deaf, and Aphasic Children

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IT HAS been suggested that auditory background or experience is an important component of the perception of time.[1] Results of an experiment by Hirsh, Bilger, and Deatherage, for example, indicate a strong relation between the apparent duration of auditory and visual stimuli and the level of ambient auditory stimulation.[2] Since rhythmic perception is a form of time perception, might it be dependent upon auditory experience? A relation between temporal perception and audition implies that the absence of hearing should have a significant effect on the ability to perceive rhythmic patterns, even when they are presented through a non-auditory sense modality. In an attempt to answer this question the writer chose for study four groups of children: normal, blind, deaf, and aphasic. The first two groups of course included children with normally functioning auditory mechanisms; the second two those with a loss or impairment of auditory experience.

In order that the sensory modality be common for all groups, tactile stimulation was used. The hypothesis to be tested was that individuals having had auditory experience with time and with rhythm perception would tend to differ from those having had little or no experience in time perception mediated by the auditory mechanism. The blind group was chosen in addition to the control (normal) group to observe the negative effect of absence of visual experience on rhythmic perception. Two specific questions were addressed in the study:

1. How do the four groups compare with respect to differences in tactile perception of rhythmic patterns?

[1] Ira J. Hirsh, "Certain temporal factors in audition," *Science*, 116 (1952), 523.
[2] Hirsh *et al.*, "The effect of auditory and visual background on apparent duration," to be published in *American Journal of Psychology*.

2. How do the groups compare as to the amount of learning (rate of improvement in perceptual discriminations) over a series of repeated tests?

Ten subjects each for the normal, blind, deaf, and aphasic groups were chosen from schools and institutions in the St. Louis area with the assistance of the principals and staffs of the Stix Public School, the Missouri School for the Blind, and the Central Institute for the Deaf. The groups were matched for age, sex, and as far as possible in Intelligence Quotient. Each group contained seven boys and three girls ranging in age from eleven to thirteen. The overall IQ range of the subjects was 72 to 164.

Rhythmic patterns for the study were the recordings of the Rhythm Test of the Seashore Measures of Musical Talents[3] Series "A," consisting of thirty pairs of rhythmic patterns, each pair to be judged similar or dissimilar, presented in order from the least to the most difficult. The 78 rpm discs of the test were rerecorded on magnetic tape at a speed of fifteen inches per second so that the frequency of the stimuli could be changed from 500 cps to 200 cps, a frequency at which several investigators have noted maximum tissue resonance and maximum fingertip sensitivity. The reduction in frequency from auditory to tactile presentation was effected by rerecording from the 500 cps test tape through a square wave generator, whose biased output was passed through a waveform generator, a pulse generator, an oscillator and an electric switch, in order to maintain tempi, but alter only frequency. The oscillator was set at 200 cps, and the output of the electronic switch activated recording heads on a second tape recorder. For tactile presentation of the test material, a bone-conduction vibrator, such as is used in audiometers, was connected to the output of the tape recorder. A chair was arranged so that each subject could rest his arm comfortably and without slipping on an armrest housing the vibrator. In a quiet room each subject was seated and directed to place his right index fingertip on the surface of the vibrator. He was instructed that he would feel, in rapid succession, pairs of rhythmic stimuli which he was to judge as either *same* or

[3] Carl E. Seashore *et al.*, *Manual of Instructions and Interpretations*, rev. ed. (Camden: RCA, 1939).

different, by comparing the characteristics of the second stimulus pattern with those of the first. Judgements reported as *Yes* or *No* were accepted from those subjects who had difficulty in speech production.[4]

In order to acquaint the subjects with the task and to see if the instructions were understood, sample pairs from the first series of ten pairs were presented at random as a pretest. Ten successive trials of Series "A" of the Seashore Test were then administered over an average of three-and-one-half weeks for each group. The number of correct

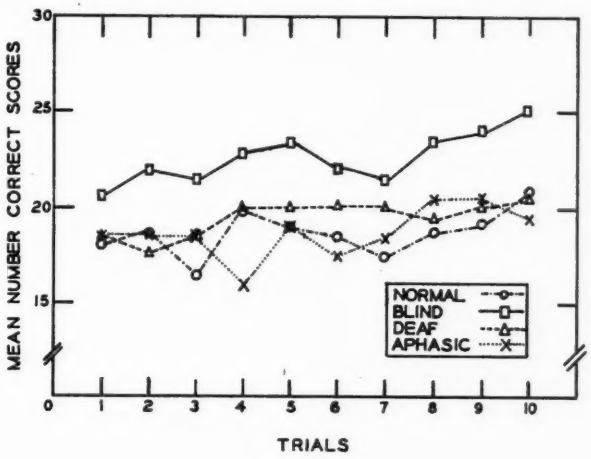

Figure 1

discriminations out of thirty pairs of stimulus patterns was taken as the score for each trial. In the graph (Figure 1), the mean number of correct scores for each group are represented on the ordinate, and the number of the trial on the abscissa.

Inspection of Figure 1 indicates that the blind group surpasses the other three groups in tactile discrimination of rhythmic patterns (over all trials). No great difference is noted in the performance of the other three groups. When

[4] In an unpubl. Master's thesis (Wash. Univ., St. Louis, 1956) with the same title as this paper, the author gives a detailed account of the apparatus, rerecording technique, test procedure, and a full statistical treatment of the results, including findings on amplitude of vibratory stimuli required and effect of distracting stimuli.

the mean of the group of blind subjects is compared with the mean of the other groups, a significant difference is found: 95 per cent of the variance around the mean may be attributed to the performance of the blind group.

Figure 1 also shows a significant difference between the hearing and non-hearing groups with respect to the effect of practice on performance on successive test trials. Weitz and Fair, in reviewing studies on training in auditory rhythm, find conflicting data, and conclude there is some doubt that training improves performance in discrimination.[5] Klauer finds no difference in discrimination with or without training in the same test (auditory presentation) used in the present study.[6] Likewise Baugh concludes that rhythm perception is an entirely separate capacity, apart from training, environment, or general intelligence.[7] The correlation obtained in the present study between IQ and individual scores is .3482 (significant at the five per cent level of confidence) which does not tend to support Miss Baugh's findings. It should be noted, however, that different sense modalities are involved in her test and the one here reported. From the differences noted in performance in repeated test trials it may be inferred that auditory experience plays some role in the *improvement* of rhythmic discrimination, though the results do not show that it contributes to improved initial rhythmic discrimination.

Summary and Conclusions

A series of ten trials, each utilizing Series "A" of the Rhythm Test of the Seashore Measures of Musical Talents, was presented through tactile stimulation to groups of normal, blind, deaf, and aphasic children to test the hypothesis that time (a dimension of rhythm) perception is dependent on auditory experience (in the normal and blind groups) and that impairment in such perception would be noted in non-hearing groups (the deaf and aphasic). Re-

[5] Joseph Weitz and K. L. Fair, "A survey on studies of rhythm," *USAF Human Resources Research Center*, Res. Bull. 51–4 (1951).

[6] Naomi J. Klauer, "The effect of training in rhythm upon rhythmic discrimination in the intermediate grades," Unpubl. M.S. thesis (Univ. of Iowa, 1924).

[7] Elizabeth Baugh, "Development of rhythm perception through training," Unpubl. M.S. thesis (Ohio State Univ., 1928).

sults obtained yield these statistically significant observations:

1. The blind, as a group, perform better in tactile perception of rhythmic patterns than do the deaf, normal, and aphasic groups.
2. The blind and normal groups improve on repeated trials in discriminating rhythmic patterns, but the deaf and aphasic groups do not.

Although the first finding does not tend to support the hypothesized relation between auditory experience and time perception, the second finding tends to indicate some relation between auditory factors and the learning of discrimination in rhythmic patterns.

Prior to the initial trial, threshold for feeling measures were obtained for all subjects. The average presentation levels (above threshold) of the test stimuli run as follows: blind, 19.2 db; normal, 19.2 db; aphasic, 19.5 db; and deaf, 22.2 db. When the groups are averaged with respect to presentation levels, it is found that 99 per cent of the variance around the average is contributed by data supplied from the deaf group. The increased sensitivity of the deaf group to vibro-tactile stimulation, it is interesting to note, did not seem to bear upon its ability to discriminate the rhythmic patterns.

Reading—The Key to Progress for Deaf Children*

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MANY factors have a determining influence upon the educational development of children who are handicapped by deafness, but the establishment of communication is a first essential. We think at once of lip reading and speech, "heard" and written language, and reading as the media through which communication is provided, but among these avenues of communication for learning, reading supersedes the others. While speech, to us who employ oralism in our teaching, is important and highly desirable, it is not vital to progress. Development of communication and educational growth can and do take place through such means as written language, finger spelling, or combined means. This fact points up language as the basis for communication and a most necessary key to progress; for language, both the understanding and the use of it, is recognized as a universal need. Russell calls language one of man's most important activities, without which civilization would perish.[1]

Still, language is not *the* key to progress for deaf children. It is an entirely necessary pre-requisite; it is basic; and it must be developed to a high degree of understanding and use. But there is something more that is necessary to insure "progress." Here it may be said that the deaf child is not able to read unless he knows language. That is true but being proficient in language does not make a deaf child able to read any more than it does a normally hearing child who has no significant language problems. There are numbers of children of average and above average intelligence in schools and in remedial reading classes and clinics who have no hearing impairment and

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[1] D. H. Russell, *Children Learn to Read*, (Ginn and Co., 1949), p. 21.

no specific language difficulties. This prevalence of reading deficiency in the face of normal language ability indicates that language is not *the* key to progress. The child must have a means of satisfying his stimulation and desire to know, which is a part of his development. He needs a way of "finding out" for himself and of learning about the experiences of others. It is only ability to read that will meet these needs. Placing such emphasis on reading does not minimize the necessity of language, for the two go together. One supplements the other and they cannot be separated.

The prime importance of reading in modern living emphasizes its key position in the education of deaf children. We live in a reading age. In spite of the widespread use of pictorial communication of ideas through movies and television, picture magazines, comic strips and comic books, there still remains an ever growing need for reading.

Russell says that reading is not only related to language activities but in the modern world cannot be separated from such processes as seeing movies and listening to the radio. The wide use of pictures and illustrated materials does not remove the necessity for reading ability but, on the contrary, stimulates a need to be able to read the printed language accompanying them. These general demands for reading extend all the way from the child's desire to know what it says on the cereal box about the prizes pictured there to the adult's need for reading recipes or directions for do-it-yourself projects, and for filling out job application blanks and income tax returns. In addition to these utilitarian needs for reading, the great enjoyment and satisfaction and the enrichment of values that come from reading cannot be fully measured.[2]

Artley says "the ability to read is required of all children for good living in our modern world. The person who cannot read is frustrated at almost all levels. We depend upon reading for our jobs, our information, and our pleasure. We literally read to live."[3]

After conceding the first-place importance of reading,

[2] Russell, p. 3.
[3] A. S. Artley, *Your Child Learns to Read* (Scott, Foresman and Company, 1953), p. 3.

we would be happy to be able to say that the deaf generally have average or high reading ability but such is not the case. In the studies reported by Dr. Gladys Pugh in 1946[4] and by Dr. Irving Fusfeld in 1954[5] it was found that severe retardation existed as shown by achievement scores in word meaning, sentence comprehension, and paragraph comprehension. In addition to such studies as these, the weakness in the reading ability of deaf children is revealed through the standardized reading tests given regularly in classes and schools for the deaf. While at some levels the results are fairly satisfactory, they are distressing at others, especially in middle and upper grades.

Reading for all children takes on particular significance at the middle grades, for it is at this stage that wide reading begins, and the child must now read to learn. The curriculum must meet his expanding interest in science, history, geography, biography, and travel. As he progresses into the upper grades, the reading demands become increasingly greater. The deaf child who has satisfactory reading ability possesses a valuable means of compensating to a great degree for much that he misses in what goes on about him continuously in casual conversations and discussions, radio and television programs, and the innumerable situations through which a hearing child is able to absorb knowledge.

However, it is in the middle grades that reading for all children has a tendency to bog down. Professional literature on modern reading contains many discussions on middle grade reading problems and the "hump" in reading at about fourth grade. There are several reasons for the slowing up in reading ability at this period.

In the first place there is what has been termed a transition point from low-level to a higher-level ability in reading. The child up to this time has been taught skills for primary reading, but he usually does not as yet use them for himself. He needs constant help and guidance from the

[4] Gladys S. Pugh, Ph.D., Summaries from "Appraisal of the Silent Reading Abilities of Acoustically Handicapped Children," *American Annals of the Deaf*, Vol. 91, Number 4, 1946, pp. 331–349.

[5] Irving S. Fusfeld, *A Cross-Section Evaluation of the Academic Program of Schools for the Deaf*, Gallaudet College, Bulletin No. 1, Vol. 3, Feb., 1954.

teacher in order that he may become more facile in applying them. There are also new skills to be developed, for the reading program, as Russell points out, must be conceived as a developmental one, stretching at least from the first to the twelfth grade.[6] This statement is based on the fact that children can and need to continue to improve their reading abilities beyond fourth grade.

The reading instruction at these levels should also include new ways for the child to apply the skills he already knows. The comprehension skills in narrative reading, for example, are different from those required in studying various other subjects. Studying arithmetic, the child must think about quantities, and he reads to solve something. In history, his reading is concerned with people and conditions and events that affect their way of living. Reading in geography and science call for yet different kinds of thinking with different skills employed in reading. Each of these subjects has skills peculiar to it and, consequently, specific reading instruction should be given in each.

It is frequently stated that the failure of teachers to continue to give reading instruction beyond the primary grades and to recognize the specific problems involved in the different types of reading is an important factor in the pupils' middle-grade slump in reading and their later poor reading ability.

A brief analysis of the general problems involved in teaching narrative and study-type or informative reading will reveal differences. The purposes in reading in the two are not the same. The main objectives in narrative reading are to appreciate the various human situations and relationships presented in a story and to grow in general knowledge. Content subject matter, on the other hand, is read chiefly to gain information and factual knowledge. The child will be aided in achieving these purposes if he understands the structures of the reading material of the two kinds, for they are constructed along different lines.

In narrative reading the child must learn that a story has action or movement—that something happens. He must know that it has characters who participate in the action, a setting in time and place, and a plot involving

[6] Russell, p. 243.

the movement from the initial setting through the action to the climax. From the time the child begins to read simple narratives in readers, he should know the WHO or WHAT, WHERE, WHEN, and WHAT HAPPENED in each story. The WHERE may be as simple as, "At home," "At school," "Outdoors," "In the Park." WHEN may be "In the morning," "In winter," "One day," or, at a later level, "In colonial days (or times)," "In modern times," etc. The plot of the story—*however simple*—unfolds in the proper sequence through the incidents that tell WHAT HAPPENED.

There are certain important points that should be discovered in the movement of the story. They include: the first incident that affects the status quo of the opening situation; the incident that grows out of the first one; and subsequent incidents that lead to the climax and the concluding events.

The story of "Fisherman Jim"[7] in the Macmillan Second Reader is an excellent example of this story structure. The first incident that affects the friendly status quo of Jim in his neighborhood occurs when the storekeeper *suggests* that Jim give away fewer fish, sell more, and get more money. The incident that grows out of this first one happens when Jim *thinks about* the storekeeper's remark and *decides* to move nearer the lake. The subsequent incidents include Jim's several moves to cottages nearer the lake and the climax comes, not when he moves back to the old happy neighborhood, but when, after thinking it over, he *makes the decision* to go back. Moving back and resuming activities among neighbors and friends constitute the concluding events.

A significant point for the child to be trained to recognize is that the situation at the end of the story is never exactly the same as it is at the beginning. Something is always changed in some way or why have a story? In the case of Fisherman Jim the change came in his deeper appreciation of his friends and neighbors and of the value of sharing with them in neighborliness. This somewhat intangible change should not be pointed out in a didactic manner.

[7] "Fisherman Jim," Gates-Huber *New Friends and Places,* Basal Second Reader, (Macmillan Co., 1954), pp. 32–45.

but the teacher can, through adroit questions and guidance of the discussion, lead the children to discover it themselves.

Another factor that is evident in narrative reading is the emotional tone. As the incidents take place, the accompanying emotion should be discovered through the verbs, adjectives, and expressions which reveal the changes in feeling. Referring again to "Fisherman Jim," the first part of the story contains clues to the emotional tone in such words as "gave," "glad," "good friend," "many friends," "a good man," "glad he lives here." Later when Jim is selling more fish to get more money but at the price of sacrificing his friends and his way of life, the story contains "not happy," "no fun to fish now," "lost all my friends," "without friends," "very sorry for himself," etc. In the concluding part of the story are found "gave fish to his friends," "helped his friends," "fun to work and fish now," "a happy man now." The children enjoy finding the words that reveal the swings in mood as the story moves and they themselves will begin to "feel" with or against the characters. They will react emotionally to the incidents and will thus be *experiencing* what they read.

Much help in interpreting the story may come from the illustrations accompanying it. The illustrations should be enjoyed for their beauty and examined for what they reveal. As a means of testing comprehension, the children should verify the action or circumstances shown in the pictures by finding the definite sentence or paragraph that relates to each one. The technique of "find it in the story" should be used in discussions and questions about the characters and incidents in the story. Questions should not contain the exact wording used in the story, so that when the pupil verifies his answers by finding the same ideas expressed in the story in different words, he shows comprehension.

Another purposeful part in the construction of a story is the title, sometimes amplified by sub-titles. The title may be explanatory, as, "A Day in the Park" or it may indicate something to be discovered in the reading of the story, as, "A Strange Cargo." The title should always

be discussed at the beginning of the lesson and reference should be made to it again at the conclusion to show how it points out the central theme of the story.

The titles and sub-titles in informative reading also carry out a very definite function. They help in organizing the information contained in the chapter or section or unit. For example, a fourth grade geography lesson about Norway[8] is titled "Norway," which names the general subject of the lesson. The subtitles which follow carry the discussion through a comprehensive description, suitable for fourth grade level, of living in Norway. The subtitles are, "Sunny Nights," "Sunless Winters," "Fishermen," "Land of Forests," "Small Farms," "Dairy Farming," and "Water Power." Preliminary map study of the location and topography of Norway, accompanied by skillful questioning will bring out the general facts indicated by the subtitles; then careful reference to these headings organizes the child's thinking before he begins to read the lesson.

Using simple material at first, the child needs assistance in learning how to gather the facts contained in what he is reading. It must be explained to him how paragraphs are usually constructed. He must be shown that a paragraph has a topic sentence or general statement at or very near its beginning. Then following it come supporting sentences, statements of the facts giving the exposition of the topic itself. The child must be told about the concluding or summarizing sentences or the transition sentence which carries on to the next paragraph. As in narrative reading, reference should be made again in summary fashion to the title and subtitles to help the child organize the information he has read. These study techniques in reading, as well as all those enumerated thus far, should be begun in easy stages in connection with simple reading material, then expanded and extended as the reading increases in difficulty, enabling the child to grow in power to read independently.

While the aspects of paragraph construction which have been discussed are general in content subject reading,

[8] Branom and Ganey, *My World of Neighbors*, (W. H. Sadlier, Inc., 1948), pp. 182–184.

the purpose which the child brings to his reading, as previously indicated, is not the same in all subjects. Here, also, the child needs specific instruction. The teacher should be a teacher of reading in each subject.

In searching for ways and means to help deaf children, not only to make the middle-grade transition, but also to read better at all levels, the teacher must keep constantly in mind the goals to be achieved—in other words, to be aware constantly of what reading is. The new concept of reading is that it is a process involving certain steps or stages which, while distinct in themselves, are fused into the complete act of reading. Gray designates reading as a four-step process and gives the four steps as perception, comprehension, reaction, and integration.[9] Other authorities may use slightly different terminology but there is general agreement upon the factors that make reading an experience.

An analysis of these four steps to see what each involves will help to reveal the particular areas of difficulty for deaf children. Upon that basis emphasis may be determined and remedial measures pursued.

The first step, word perception, consisting of word recognition and word meaning, presents particular difficulty to deaf children because they lack the large hearing and speaking vocabulary possessed by children who hear. That vocabulary development is a problem for the deaf is shown by the usually low scores reached by them in standardized reading tests. The development of vocabulary, then, becomes a first requisite. The study of words should go on every part of the day in every activity in a vitalizing stimulating way.[10] New words should be developed in context. They should be associated with known words; they should be grouped, organized, reviewed and *used* by the teacher as well as by the children. Systematic and consistent training in vocabulary expansion is necessary in each subject and in relation to every activity.

[9] W. S. Gray, *On Their Own In Reading*, (Scott, Foresman and Co., 1948), p. 35.

[10] M. H. Fitzgerald, "Vocabulary Development for Acoustically Handicapped Children," *American Annals of the Deaf*, Vol. 94, Number 5, Nov. 1949, pp. 409–449. Also in Reprint, American Annals of the Deaf, Gallaudet College, Washington, D. C., 1956.

The children need to know the meanings of the words that are more or less peculiar to science, arithmetic, history, etc., as well as those occurring in narrative reading. Unless the meanings of words are clear, comprehension cannot be achieved. Russell states that a child's understanding and interpretation of sentences and paragraphs will depend considerably upon his knowledge of the individual words in the larger units.[11]

After vocabulary comes sentence comprehension. When the child sees words arranged in meaningful context constituting a sentence, he is confronted with a problem far more complex than recognizing words and their meanings. He must grasp the meaning of the total unit. He must recognize the relation of the subject of the sentence—the doer—to the action expressed by the verb, and the further relation to the object or whatever the remaining component part or parts may be. While he must know the meanings of the words individually, he must put them together synthetically to form a unit of thought. While this process is not so difficult in the child's own experiential reading and language work, it presents a much greater problem when he comes to read about the experiences of others. This matter of sentence comprehension is a crucial one in beginning reading, particularly for a deaf child because, if he does not recognize the unit of thought, he is not reading but only calling words, thereby getting a false impression of what it means to read.

There are several factors within the structure of sentences which teachers need to emphasize as aids to better comprehension. Among points to be stressed are the important function of the verb, the relation of pronouns and their antecedents, the meanings carried in potential auxiliaries, and the complexity of ideas expressed in conditional clauses. Most of these sentence structure features fall in the area of language teaching, but the test of understanding them comes in reading.

The importance of the verb as the "heart" of the sentence cannot be over-emphasized from the beginning. The verb is the word that tells "what happens" to the person or thing named in the subject. As the story increases

[11] Russell, p. 184.

in length, it is the verbs largely which carry the sequence of action and make the story move, while expressions denoting time orient the action definitely for the reader. Occasionally "flashbacks" in the story complicate the orientation of time and further assistance to the learning child is necessary.

High in incidence in reading material and appearing early are pronouns and their antecedents. The child quickly loses the thread of thought in a sentence or paragraph unless he is clearly aware of the correct antecedent for each pronoun. Frequently, in middle and upper level reading, pronouns occur whose antecedents are, not words, but facts or whole incidents expressed in one or more sentences. "I don't believe *it*," "So *that's* the reason he did *it*," and in a summarizing sentence such as, "So *that's* how the bridge was built," are examples of such pronouns. Frequently, also, an impersonalized or generalized pronoun may be found injected in a narrative, as, "If *you* would try to do that —," "you" meaning anybody. Deaf children need help in understanding that such statements are deviations from the thread of the plot and are inserted for the purpose of summary or emphasis of the main idea. The elusiveness of antecedents of pronouns is also evident in direct quotations in sections of conversation introduced in a story.

The inverted order presents difficulty in sentence comprehension. At the primer level we may find, "Away ran the dog." At the fourth grade level appears, "Near the middle of the wedge of soaring Canadas flew Gray Wing, a splendid young gander."[12] A technique that usually proves useful in learning to untangle such sentences is to look first for the verb (for it carries the action), and then the subject as the doer of the action. After "thinking" that much of the sentence through in natural order, it is usually easy to fit in the remaining ideas. It should be noted that deaf children need to be *taught* how to get the thought in sentences having the inverted order. This different arrangement of words in meaningful context does not automatically become oriented for them.

[12] "Gray Wing and Nika," *More Times and Places* (Scott, Foresman and Co., 1956), p. 134.

Sentences in reading material at intermediate and upper grade levels, whether narrative or informative, increase in length and necessarily contain many clauses, making the language more complex. Clauses may contain the potential force carried in the auxiliaries "may," "can," "must," "might," "could," "would," or "should." They may have the certainty or uncertainty expressed in the verbs "supposed," "believed," "thought," or "wondered"; the conditional circumstances denoted in such introductory words as, "if," "though," "unless"; or the indefiniteness of "whoever," "wherever," "whenever." All of these, while primarily developed in the teaching of language, constitute a wide and perplexing array of sentence constructions frequently encountered in reading and needing to be mastered. The solution calls for a close relation between reading and language. If the every day experiences of the children are used as the medium for clarifying these constructions, they will serve as anchors to which the bewildering clauses may be fastened, and the meanings of the various and variable connecting words will come clear.

All of the factors which tend to make sentence comprehension difficult enter also into the reading and comprehension of paragraphs. Here, however, further skills are required. The child must read, not only to get details and comprehension of each sentence, but also to get the central idea in larger units and to predict the outcome as a preparation for the ensuing part of the story. Specific and consistent teaching of basic skills in reading is necessary. They do not "come naturally," especially to deaf children with their language and vocabulary handicap.

The test of a child's real comprehension of what he reads is in his reaction to it. If he sees in his mind a picture of the persons, places or scenes described, and if the action carried by the verbs transpires mentally for him, he can't help but have feelings of approval or disapproval, enjoyment, amusement, surprise, wonder, suspense, and so on. He will react to what he reads. The child who suddenly laughs aloud or gasps when reading silently, or who goes to a map or encyclopedia for further information is, without doubt, comprehending what he is

reading. This reaction to what he is reading constitutes the third step in the reading process. Then if the child sees a relation between what he reads and his own experiences, or between new facts and what he already knows, he is beginning to achieve the fourth step which is *integration*. Only then is he realizing the completeness of really reading, described by Gray as "a process of recognition, experiencing, thinking, and learning."[13]

All children, in so far as it is individually possible, are entitled to the accomplishment of this goal. The methods by which it is achieved by deaf children are the same, except for certain points of emphasis, as they are for children who hear; yet the average reading ability of the former group is considerably lower than that of the latter. This is evidence of the great need for improving the reading efficiency of the deaf in order that it may function as the key to their progress.

[13] William G. Gray, "Foreword" in *Your Child Learns to Read* by A. S. Artley (Scott, Foresman and Company, 1953), p. VIII.

AMERICAN ANNALS OF THE DEAF

Index to Volume 102

1957

Authors, Subjects, and Titles of Articles

Paging, Vol. 102: Jan. 1–228; Mar. 229–290; May 291–338; Sep. 339–386; Nov. 387–432.

A

Adjustment to Total Deafness, An Institute on, New York School for the Deaf, 399

ADMINISTRATION
—changes in, listed by state, 364–368
—Joe R. Shinpaugh, Amer. sch., 364
—John A. Gough, Kendall sch., 364
—William J. McClure, Indiana sch., 364
—Joseph Giangreco, Iowa sch., 365
—George Henry Thompson, Nebraska sch., 365
—P. Archer Bardes, Central sch., N. Y. 365
—John G. Nace, Mt. Airy sch., 365
—Charles G. Rawlings, Penn. Oral sch., 366
—W. Lloyd Graunke, Tenn. sch., 366
—William M. Milligan, Texas sch., 366
—Robert W. Tegeder, Utah sch., 366
—Paul E. McLelland, Virginia sch., 367
—Kenneth F. Huff, Wisconsin sch., 367
—William E. Ransdell, Wisconsin sch., 367
—Irving J. Fusfeld, California sch., 368

AGE
—of admission to schools for the deaf, 118

Alexander Graham Bell Association, Meeting, 102, 339, 387

AMERICAN ANNALS OF THE DEAF
—annual index, Volume 102, 416–418
—review of publications, 157–163
—statistical review, 69–127
—tabular statement of schools, 69–127

AMERICAN INSTRUCTORS OF THE DEAF
—directory, 2

American Speech and Hearing Association, Meeting, 102, 339, 387

ANNOUNCEMENTS
—*See* various organizations

APHASIA
—in schools and classes, 118, *See also* 399–403

AUSTRALIA
—schools and classes, 126–127

B

BINDON, D. MARJORIE
—*Personality Characteristics of Rubella Deaf Children: Implications for Teaching of the Deaf in General,* 264–270

BLAIR, FRANCIS, X.
—*A Study of the Visual Memory of Deaf and Hearing Children,* 254–263

BOATNER, MAXINE TULL
—*Vocational Education Under the Gallaudets,* 300–311

BRANDON, WALLACE, R.
—*Foreign Language Study and the Deaf Student's Vocabulary,* 312–318

C

CAMPS
—summer camps for deaf and hard of hearing children, 151–156

CANADA
—schools and classes, 121–125

Cerebral-Palsied Deaf Pupil, The, Porter, 359–363

CLASSES—*See Schools*

CLINICS, SPEECH AND HEARING
—in colleges and universities, 190–197
—in hospitals, 198–202
—privately operated, 204–205
—in schools for the deaf, 206–207
—medical schools, 208–211
—state depts. of ed. having a sp. and h. program, 128–129
—state depts. of health having a sp. and h. program, 130–131
—state societies having a speech and hearing program, 132–133

COMMUNICATION
—and the deaf, 118

CONFERENCE OF EXECUTIVES OF AMERICAN SCHOOLS FOR THE DEAF
—announcements 1,
—29th Regular Meeting, Program, 229. 230, 340–341

CONVENTION OF AMERICAN INSTRUCTORS OF THE DEAF
—announcement, 1
—38th Biennial Meeting, Program, 231–239, 340

D

DACTYLOLOGY—*See Manual Language*
DAY SCHOOLS AND CLASSES—*See Schools*
DENOMINATIONAL SCHOOLS—*See Schools*
DIRECTORY—*See also schools*
—of American Instructors of the Deaf, 2–68
—of teacher training centers, and centers granting degrees or college hours of credit, 180–189
DOCTOR'S DISSERTATIONS—*See Education of the Deaf*
DOANE, RAY C.
—*Suggestions for Improving Vocational Training,* 356–358

E

EDUCATION OF THE DEAF
—doctor's dissertations and master's theses on, 169–177
ELSTAD, LEONARD M.
—*Gallaudet College Accredited,* 291–292

F

Films—*See Publications*
FINGER SPELLING—*See Manual Language*
FITZGERALD, MARGARET H.
—*Reading—The Key to Progress for Deaf Children,* 404–415
Foreign Language Study and the Deaf Student's Vocabulary, Brandon, 312–318

G

GALLAUDET COLLEGE
—*Gallaudet College Accredited,* Elstad, 291–292
—Centennial of the Kendall School, 339, 387
—honorary degrees, 368–369
Gallaudets, Vocational Education Under The, Maxine Tull Boatner, 300–311
GALLOWAY, J. H.
—*New York State Association of Educators of the Deaf Convenes in Rochester,* 251–253
GOETZINGER, C. P. AND C. L. ROUSEY
—*A Study of the Wechsler Performance Scale* (Form II) *and the Knox Cube Test with Deaf Adolescents,* 388–398
Group and Wearable Hearing Aids in a Residential School for the Deaf, Prall, 240–250

H

Hard of Hearing, 118
Health—*See Clinics*
HEARING AIDS
—in schools and classes for the deaf, 118
—*in a Residential School for the Deaf, Group and Wearable,* Prall, 240–250

I

INSTRUCTORS
—Directory of American Instructors of the Deaf, 2–68
INTERNATIONAL CONFERENCE ON AUDIOLOGY
—meeting, 1
INTERNATIONAL CONGRESS ON THE EDUCATIONAL TREATMENT OF DEAFNESS
—meeting, 339: 387
INTERNATIONAL COUNCIL FOR EXCEPTIONAL CHILDREN
—meeting, 1; 339; 387

K

Kendall School, Centennial, 339

M

MANUAL LANGUAGE
—in schools and classes, 118
MASTER'S THESES—*See Education of the Deaf*
Meaningful Mathematic Problem Work for the Deaf, Newman, 293–299
MULTIPLE HANDICAPPED
—in schools and classes, 118

N

NECROLOGY
—list, 178–179
NEWMAN, LAWRENCE
Meaningful Mathematic Work for the Deaf, 293–299
New York State Association of Educators of the Deaf Convenes in Rochester, Galloway, 251–252
NEW ZEALAND
—schools and classes, 126–127

O

P

Performance of Deaf and Hearing College Students on Verbal and Non-Verbal Intelligence Tests, The, Stunkel, 342–355

Personality Characteristics of Rubella Deaf Children: Implications for Teaching of the Deaf in General, Bindon, 264–270
PORTER, VAN C.
—*The Cerebral-Palsied Deaf Pupil,* 359–363
PRALL, JOSEPHINE
—*Group and Wearable Hearing Aids in a Residential School for the Deaf,* 240–250
PRESCHOOL
—preschool enrollment, 118
PRIVATE SCHOOLS—*See Schools*
PUBLICATIONS
—reviewed, 157–163
PUBLIC SCHOOLS, *See Schools*

R

READING
—*Reading—The Key to Progress for Deaf Children,* Fitzgerald, 404–415
RELIGIOUS WORK WITH THE DEAF
—religious personnel in work for the deaf, 134–150
REVIEW OF PUBLICATIONS, 157–163
ROSENSTEIN, JOSEPH
—*Tactile Perception of Rhythmic Patterns by Normal, Blind, Deaf, and Aphasic Children,* 399–403
ROUSEY, C. L. AND C. P. GOETZINGER
—*A Study of the Wechsler Performance Scale (Form II) and the Knox Cube Test with Deaf Adolescents,* 388–398
Rubella Deaf Children: Implications for Teaching of the Deaf in General, Personality Characteristics of, Bindon, 264–270

S

SCHOOLS
—tabular statement of American schools for the deaf, Oct. 31, 1956, 69–119
—and classes, Canada, 121–125
—and classes, Australia and New Zealand, 126–127
—public residential, 69–85
—public day, and classes, 86–107
—denominational and private, 108–115
—and classes for the multiple handicapped, 116–117
—summary, 118–119
SIGN LANGUAGE—*See Manual Language*
SPEECH
—in schools and classes for the deaf, 118
SPEECH AND HEARING
—in clinics in colleges and universities, in hospitals, private clinics, schools for the deaf, medical schools, *See January Annals*
STATISTICS
—schools, *See January Annals*
STUNKEL, EVA RUSSELL
—*The performance of Deaf and Hearing College Students on Verbal and Non-Verbal Intelligence Tests,* 342–355

T

Tactile Perception of Rhythmic Patterns by Normal, Blind, Deaf, and Aphasic Children, Rosenstein, 399–403
TERVOORT, BERNARD, TH. M.—368
Teacher Training Centers
—Teacher Training Centers, 180–189
Tests, The Performance of Deaf and Hearing College Students on Verbal and Non-Verbal Intelligence Tests, Stunkel, 342–355

U

UNITED STATES
—Summary of schools and classes for the deaf, 118

V

Visual Memory of Deaf and Hearing Children, A Study of the, Blair, 254–263
VOCABULARY—*See Language*
Vocabulary, Foreign Language Study and the Deaf Students, Brandon, 312–318
VOCATIONAL EDUCATION
—in public residential schools, 164–167
Vocational Education Under the Gallaudets, Maxine Tull Boatner, 300–311
Vocational Training, Suggestions for Improving, Doane, 356–358

W

WATERHOUSE, EDWARD J.—368–369
Wechsler Performance Scale (Form II) and the Knox Cube Test with Deaf Adolescents, A Study of the, Goetzinger and Rousey, 388–398

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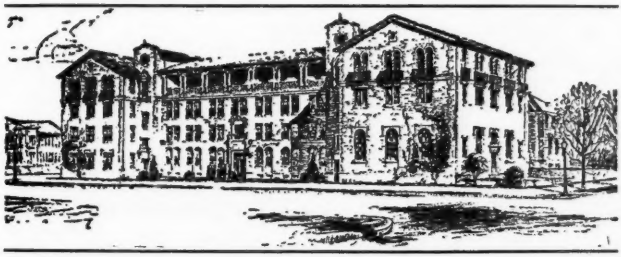

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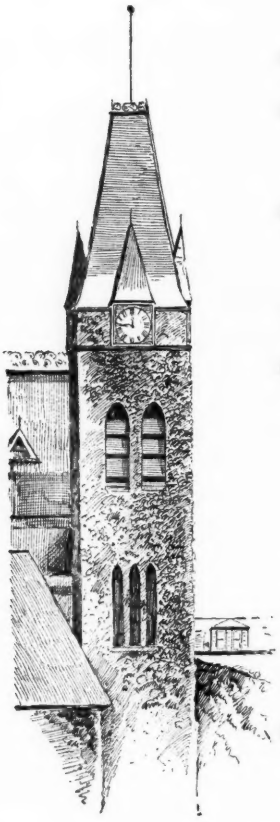

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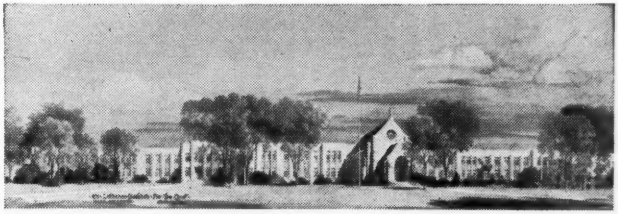

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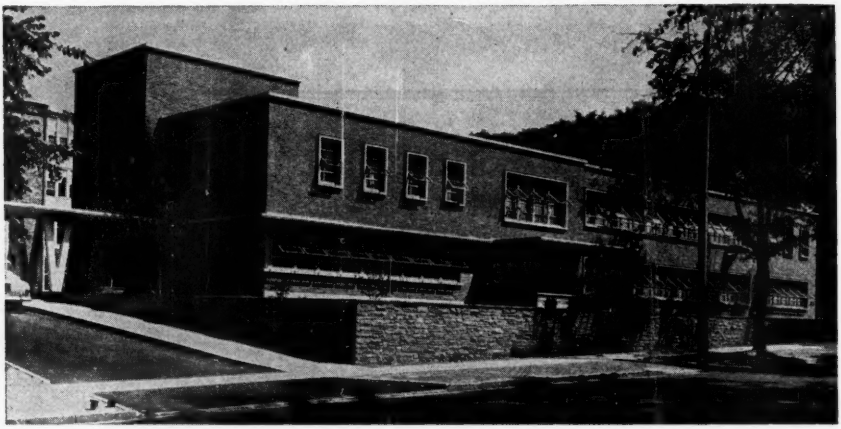

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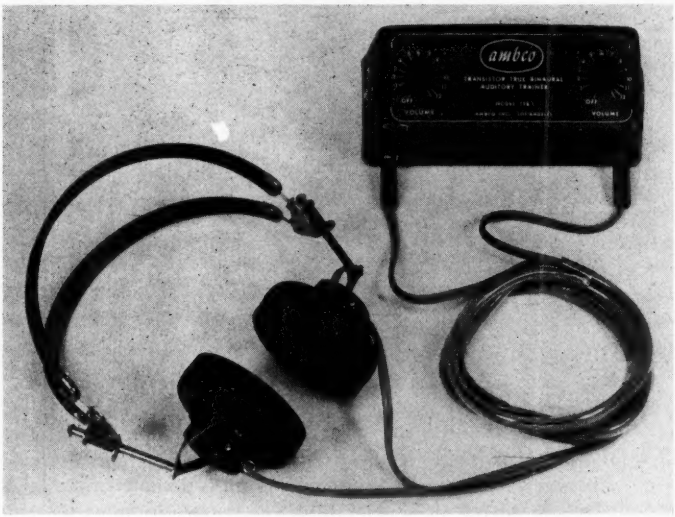

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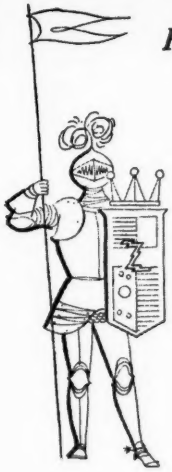

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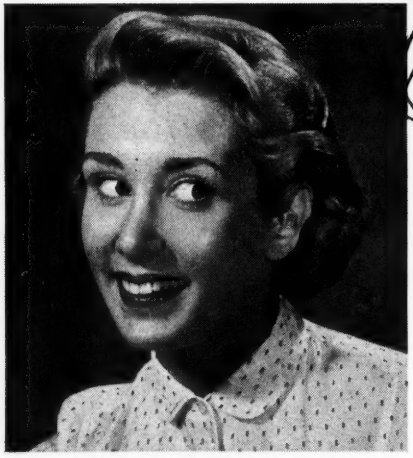

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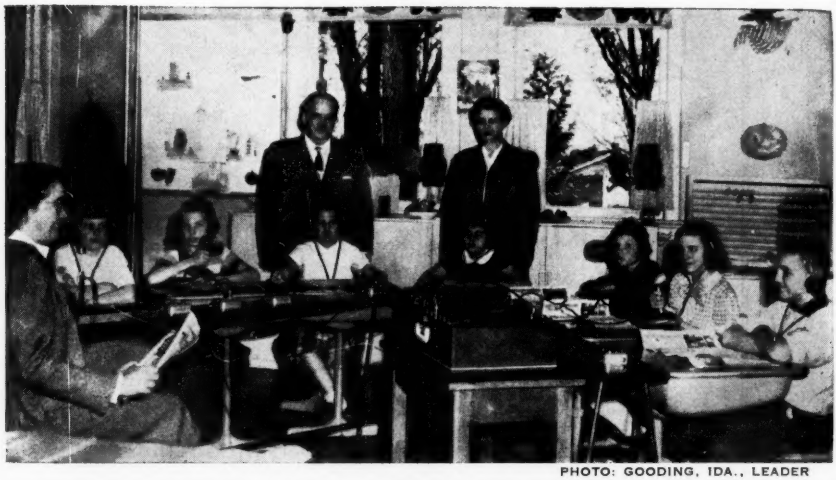

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Hugo F. Schunhoff.....West Virginia School for the Deaf, Romney, W. Va.

The Convention of American Instructors of the Deaf

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